

## Greenback Cutthroat Trout (*Oncorhynchus clarki stomias*)

**Data: Greenback Cutthroat Trout Recovery Plan-1989; Greenback Conservation strategy – 2004;**

**Partners: CO, FWS, FS, BLM, NPS, TU**

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### Status of the Greenback Cutthroat Trout:

The Greenback cutthroat trout (GCT) was believed to be extinct until 1937. Following the discovery of isolated populations, it was designated as an Endangered Species by the U.S. Fish and Wildlife Service in 1967 (32 FR 48, 4001). On April 18, 1978, The FWS published a final determination changing the status of the Greenback trout to “Threatened” (43 FR 75, 16343). In December 2005, the U.S. Fish and Wildlife Service announced a 5-year review of greenback cutthroat trout status, and this review is currently underway.

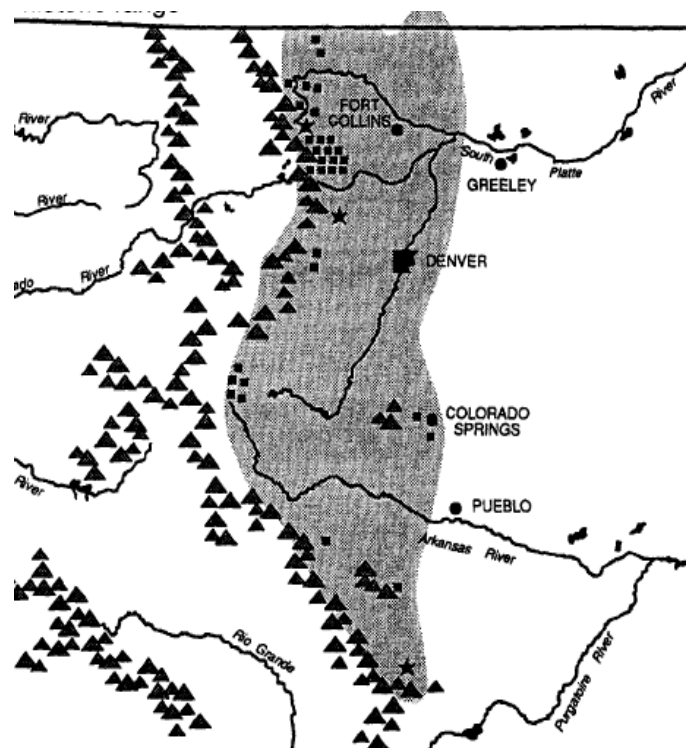
The initial Greenback Trout Recovery Plan was published in 1978, and a revised version was completed in 1998.

### Sportfishing Status of the Greenback Cutthroat Trout:

Although listed as a Threatened Species, The State of Colorado, the FWS and the NPS manage some populations for recreational angling. Populations that are considered to be genetically important, yet open to angling have special regulations requiring catch-and-release, limited harvest, and terminal tackle restrictions to maintain trout populations and prevent over-utilization. Many CRCT populations tend to lie in remote headwater drainages with difficult access, which has served to minimize angling pressure. Colorado and the NPS have closed some cutthroat waters to protect spawning populations and wild brood stocks. Angler support for Greenback Cutthroat conservation management programs is strong in Colorado and is considered an important asset to conservation and management programs.

The greenback cutthroat trout (*Oncorhynchus clarki stomias*) is endemic to the headwaters of the South Platte and Arkansas River drainages on the eastern slope of the Rocky Mountains (primarily in Colorado). It is estimated that the greenback cutthroat historically occupied up to 13,231 km of habitat (6,276 km in the Arkansas River Basin and 6,955 km in the South Platte River Basin). Although once abundant, the greenback cutthroat declined rapidly after the arrival of large numbers of immigrants to the Front Range of Colorado in the mid-to late 1800s.

### Current Range of the Greenback Cutthroat Trout



### Distribution of Greenback Cutthroat Trout:

Western native Trout Status report

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The greenback cutthroat trout currently occurs in 68 sites that total 166 hectare of lake and 165 kilometers of stream habitat. In 1999, 21 greenback cutthroat populations were reported to be stable and self-sustaining (18 in the South Platte River basin and three in the Arkansas River basin) (Young and Herig, 2001). Nine “historic” populations remain and pure greenbacks have been introduced into 52 additional streams and lakes within the species historic range. At present, twenty populations (including both historic and restoration populations) are believed to be stable self-sustaining population, but only three of these stable populations occur in the Arkansas River drainage. In 2005, Colorado Division of Wildlife reported that greenback cutthroat occur in 58 streams and lakes with 23 populations meeting the population criteria required by recovery goals (CDOW 2005).

### **Habitat Requirements of the Greenback Cutthroat Trout**

All of the present habitat where greenback cutthroat trout occur is essentially undisturbed headwater parts of the drainages from 7,000 to 11,000 feet elevation in the Rocky Mountain National Park, on U.S. Forest Service lands (Roosevelt, San Isabel, and Pike National Forest) and in one spring fed pond on Fort Carson. With the exception of the Fort Carson Pond, all habitats are associated with montane conifer forests and meadows. Some streams contain beaver dams and beaver ponds. There is nothing special or unique about greenback habitat. Essentially greenback trout can live in any habitat and tolerate any water quality that supports other species of trout. Water temperatures should not exceed 21-22 C and optimally fall in the range of 12-15 C. Given the high elevation these fish occur in, sufficient depth of pools is necessary for overwintering. Cover and shelter requirements are similar to other trout.

species. Young-of-year and juvenile fish select shallower, more open habitat; larger, older fish select deeper areas with more cover (boulders, log jams, particularly undercut streambanks).

Reproductive site requirements are similar to other trout species: suitable gravel substrate (0.25-2.0 inches) with adequate flow to maintain oxygen requirements of incubating eggs is necessary for successful reproduction. There is no evidence to suggest that greenback trout have any unique feeding preferences, distinguishing from other trout species. It can be assumed that a greenback trout of similar size and existing in similar habitat as other trout species will feed on similar food items -- predominantly aquatic insects in streams and predominantly zooplankton and benthic crustaceans and insects in lentic environments.

### **Concerns, Issues, or Obstacles relative to the Conservation and Improvement of the status of Greenback Cutthroat Trout:**

#### **Population Viability Concerns:**

Recovery efforts for the greenback cutthroat have focused on establishing new populations and locating additional historic populations, however the genetic status of fish used for these activities has come into question. In the past, genetic techniques were not available to differentiate between the cutthroat subspecies in Colorado. New genetic research being conducted at the University of Colorado and in other labs may allow subspecies to be identified using genetic techniques.

Recent studies being conducted through CU prompted the following considerations from the Colorado Division of Wildlife (Rogers, K. pers. Comm):

- Preliminary research indicates that either through natural movement or early stocking efforts by private individuals,

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federal and state groups, there may be small populations of greenback cutthroats west of the Continental Divide and populations of Colorado River cutthroat trout occurring east of the Continental Divide.

- This research is ongoing, is not available as a written report and has not yet been published or peer reviewed.
- Because of the different protections in place for these subspecies, these findings could have implications for recovery and conservation efforts for greenback and/or Colorado River cutthroat trout; however it is far too early to make broad management decisions based on preliminary findings.
- Based on the potential for new information to alter future management, management agencies are being cautious with fishery-related activities until a thorough review of the new research findings can occur.

The maintenance of genetically appropriate broodstocks for re-introductions and avoiding genetic introgression with rainbow trout or other cutthroats also remain concerns in protecting existing GCT populations.

### **Habitat Concerns**

The Greenback Cutthroat trout proved susceptible to the negative influences associated with the 19<sup>th</sup> century development of Colorado

As with other cutthroat subspecies, the distribution and numbers of GCT have declined due to human-induced influences. As a result of livestock grazing and other agricultural practices, logging, road-building, mining, and dam construction for water storage and domestic use, GCT habitat has been degraded and fragmented over time. Loss of riparian habitat, erosion, sedimentation and placement of barriers to fish migration and resultant decreased water quality from these activities have been identified as threats to most life stages of GCT.

### **Introduced Species Concerns**

The introduction and subsequent spread of non-native trout with their resultant adverse impacts is considered by many fisheries scientists to be the major threat to GCT. Many of the historic habitats of GCT have been extensively colonized by introduced (stocked), nonnative fishes. Among these nonnative species are brook trout, rainbow trout, and brown trout. Brook trout are considered to be the most significant competitor with Greenback cutthroat trout in streams, leading to the elimination of GCT in some areas.

In addition, the ease with which the greenback trout can hybridize with introduced rainbow trout demonstrates the concern about separating pure GCT populations from rainbow trout introduced for recreational fishing purposes.

### **Disease and Invasive Species Concerns**

Cutthroat trout are susceptible to common salmonid diseases, including whirling disease, which is caused by the myxosporean *Myxobolus cerebralis* (Mc). Very little is known about other diseases and parasites of this subspecies. Transmission of diseases to wild cutthroat trout populations through hatchery-based fish stocking is also recognized as a potential, but low-level concern. Colorado has statewide policies and regulations that address fish health status, disease certification for stocked fish, and stocking protocols which are designed to reduce disease concerns.

In Colorado, the presence of New Zealand Mud Snails presents an opportunity for this invasive to be spread to native trout waters, however the concern is low due to the elevation and temperature of most GCT habitats.

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### **Climate Change Concerns**

Colorado native greenback cutthroat trout may actually benefit from increased temperatures attributed to global warming, according to recent research findings at Colorado State. Scott Cooney, fishery and wildlife research assistant at Colorado State, examined how increased water temperatures due to climate change might impact greenback population distributions. Cooney's research suggests that more rapid snowmelt earlier in the year and increased water temperatures may make existing and surrounding habitats more viable for the greenback in certain locations. Cooney emphasizes the complexity of global warming and potential impacts on the environment caused by climate change. He points out that restoration plans for the greenbacks must consider how climate change may either enhance or degrade high-elevation habitats. While increased weather temperatures may provide the fish with warmer water, there are other effects that may be detrimental. (*CSU Comment NL / December 6, 2001*).

Detremental impacts to climate change could include reduced stream flows from drought and increased risk of forest fires in high elevation GCT habitats.

### **Opportunities for Improvement of the Status of Greenback Cutthroat Trout:**

The goal of the Recovery Plan for Greenback cutthroat trout is to restore the Greenback trout to non-threatened status within its native range. Additionally an objective is to assure the long-term viability of GCT throughout their historic range. The target has been to maintain at least 20 stable populations occupying at least 50 hectares (124 acers) of lakes and ponds; and 50 kilometers (31 miles) of stream. At least 5 of the stable populations should occur within the Arkansas Basin. (GCT Recovery Plan – 1998)

The Recovery Plan also identified seven specific objectives:

- **Maintain existing populations of greenbacks**
- **Establish or document 20 stable populations of greenbacks**
- **Establish captive and wild broodstocks within Colorado**
- **Conduct research on greenback angling programs and hatchery programs**
- **Conduct greenback information and education programs**
- **Promote partnerships, and expand efforts to obtain non-agency funding**
- **Prepare a long-term greenback management Plan and cooperative agreement**

Typically the potential actions for GCT improvement fall within these categories:

- genetic analysis
- fish population manipulation (non-native trout removal, re-introductions, supplemental stocking, and spawn-taking)
- aquatic habitat manipulation (barrier placement or removal, in-stream structure, flows, increasing connectivity, isolation of fragments, etc.)
- administrative and outreach actions (developing management plans, informational brochures, etc)

### **Population Surveys, genetic analyses, and fish population manipulation**

At present, there are multiple State, Federal, and private programs and conservation efforts that are working to improve the status of GCT trout in the northwestern United States and Canada. Project implementation has generally followed a site-specific and opportunity-based approach, rather than a watershed-based approach, with varied results and accomplish-ments.

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**Key actions include:**

Continue to locate and assess GCT populations
Increase and complete additional standardized genetic analyses to measure introgression and purity of greenback populations
Establish and manage hatchery brood-stocks for both the South Platte and Arkansas basins; use stocked fish to help maintain genetic diversity; and use appropriate fish stocking protocols
Develop interconnected populations that have open connectivity up and down stream segments and sub-basins where appropriate.
Expand GCT populations through restoration, reintroductions, and non-native fish control in priority watersheds

**GCT Habitat Manipulations:**

Current efforts to GCT have been directed toward improving in-stream conditions and restoring limited stream fragments, as well as putting in place protective barriers to isolate key populations, and developing BMPs for use on land management areas.

**Key actions include:**

Restore and improve altered channel and riparian zone habitats
Restore and enhance water flow, quality and sediment regimes and physical integrity of channels where feasible
Protection includes expansion of small, isolated populations where possible and maintaining or developing high quality habitats to prevent extirpation due to small population size stochastic events
Monitor and evaluate natural catastrophe impacts like fire and drought. Implement BMPs on FS, BLM, and private lands to benefit WCT habitats
Install and maintain barriers as needed to protect isolated and restored GCT populations

**Regulatory and Administrative Actions to enhance GCT status:**

Maintaining the sportfish status of the GCT and utilizing regulations to control over-utilization will be an important component of maintaining the health of WCT populations. In addition, working with others to maintain appropriate regulations for prevention of disease, water quality impairment, and habitat disturbance are important considerations.

**Key Actions include:**

Maintain protective angling regulations and assess angler use and support for greenback cutthroat angling opportunities
Work with agencies and partnerships to maintain appropriate in-stream flows and water quality standards
Conduct public outreach and communication programs to increase public support for recovery efforts

**Highest Priority Objectives for the Greenback Cutthroat Trout include:**

1. Complete additional genetic testing of GCT conservation populations to make reasonable determinations of what is a GCT and what is not. Secure additional funding for the project.
2. Establish additional stable populations in the Arkansas and South Platte River basins.
3. Prepare and sign a cooperative long-term conservation and management plan and agreement between state, federal and private interests to guide management of the greenback cutthroat after de-listing.

**Estimated Cost of recovery: \$450,000.**

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### References

1. Behnke, R. 2002. Trout and Salmon of North America.
  2. Greenback Cutthroat Trout recovery Plan. U.S. Fish and Wildlife Service, 1998. 69 pp.
  3. Colorado State University. 2001. *CSU Comment NL*.
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